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Jim Anderson, RG, CEG
Manager, Portland Harbor Section
Oregon Department of Environmental Quality
Portland, OR ZIP

Re: Comments on Interim Final Portland Harbor Joint Source Control Strategy

Dear Mr. Anderson:

Anchor Environmental, L.L.C. (Anchor) is submitting the following comments on the Interim Final Portland Harbor Joint Source Control Strategy (JSCS) on behalf of our clients, McCall Oil and Brix Maritime, two waterfront industries in the Portland Harbor that would be subject to the proposed strategy. From this perspective, our comments focus on both the technical aspects as well as implementation issues necessary to meet the objectives of the JSCS. As the Department of Environmental Quality (DEQ) moves to finalize this guidance, we appreciate DEQ's willingness to incorporate our input to this guidance document.

GENERAL COMMENTS

A major drawback to meeting the objectives of the JSCS is that it uses unrealistic screening level values (SLVs) and exposure assumptions, and exhaustive but unsubstantiated analyte lists that will effectively retain any and all sites in the harbor for further investigation. As such, it is an ineffective screening process that will do little to help identify and prioritize significant sources that are most deserving of source control. The proposed screening process will result in a tremendous waste of resources, including both public and private resources (i.e., both regulatory agencies and respondents), that will be expended on the investigation of sites, pathways, and chemicals that do not contribute substantively to the overall reduction of risk to humans or the environment in the Portland Harbor.

A more effective approach would be to develop a screening process that seeks to initially identify a short list of major contaminant sources in the harbor, based on a focused list of chemicals of concern that are likely to drive the majority of risk in the harbor. In particular, sources that represent an imminent and substantial danger, such as confirmed ongoing free product releases, should be considered candidates for an early action evaluation. Source control sites should be prioritized using a "top down" approach, by first identifying major sources that may require more immediate attention, rather than a "bottom up" approach, as the JSCS is currently structured, which retains virtually all sites for further consideration with little or no

power of discrimination. The source control strategy employed by the EPA and Washington State Department of Ecology in Commencement Bay (Tacoma) is an example of a proven model for a "top down" approach, in which major sources of contamination were fairly quickly identified to better focus source control resources.

Another limitation of the JSCS is that it places undue emphasis on source concentrations, through the use of screening level values (SLVs), but generally fails to recognize the importance of chemical mass loadings in determining impacts to water and sediment quality in the Portland Harbor. Although discharge concentration is a consideration, source control priorities should be based primarily on chemical mass loadings. Further, mass loadings provide the common denominator by which discharges from all variety of source media—surface water, groundwater, soil, air, etc.—may be compared, whereas concentrations are often not directly comparable. Mass loadings provide the information necessary to develop a load allocation model (analogous to a TMDL approach) in which the relative contributions and cumulative effects of all sources can be evaluated. This is a more holistic approach that will lead to more accurate and informed source control management decisions.

The overall process described in the JSCS for identification, regulatory approval, and implementation of upland source control actions places owners in double jeopardy. Under the proposed process an owner that implements a DEQ-directed source control action prior to the Portland Harbor ROD runs a substantial risk that the action is found later to be unnecessary to meet the Harbor ROD requirements, or must be redone under different design criteria.

SPECIFIC COMMENTS

Screening Level Values

The screening level values (SLVs) proposed for use in the JSCS contain a number of deficiencies, including: (1) certain SLVs are based on inappropriate exposure scenarios; (2) the SLV approach generally neglects the importance of chemical mass loadings; (3) certain SLVs contradict existing EPA guidance, and (4) the site ranking procedure which is derived from comparisons to SLVs is ambiguous and subjective.

Application of Numeric SLVs to Stormwater is Inappropriate. EPA recognized a number of years ago that numeric water quality-based discharge limits for storm water were difficult to develop because "Storm water discharges are highly variable both in terms of flow and pollutant concentrations, and the relationship between discharges and water quality can be complex" (EPA, 1996). Existing methodologies for deriving numeric water-quality based effluent limitations are generally not applicable to stormwater because "These methodologies were designed primarily for process wastewater discharges which occur at predictable rates with predictable pollutant loadings under low flow conditions in the receiving waters." To develop scientifically defensible numeric criteria for stormwater, EPA recommended the use of

TMDLs, or calculations similar to TMDLs, and wasteload allocations derived through modeling.

The approach used in the current version of the JSCS is in direct contradiction to these EPA recommendations. Based on the intermittent discharge periods and exposure durations experienced in stormwater discharges, acute criteria (one-hour duration) may have some relevance. Such criteria have been used to set benchmarks in NPDES permits, and were the basis of the stormwater screening evaluation in the previous version of the JSCS, with incorporation of an appropriate attenuation factor (5x). This approach has technical merit. The use of chronic criteria (four-day duration) and especially bioaccumulative criteria (thirty year duration) have no credible scientific basis for use in screening intermittent and variable stormwater discharges. A TMDL-based approach which considers the mass loadings of the major contaminant sources to the Portland Harbor, and their relative contributions, remains the best approach for evaluating stormwater, consistent with EPA guidance.

Certain Sediment SLVs are Outdated. The "other SQVs" listed in the sediment toxicity column of the JSCS includes direct references to outdated freshwater SQVs developed by the Washington State Department of Ecology (Ecology, 1997), and indirect references to this same study via the NOAA "SQRT" tables. Ecology has since revised and updated their freshwater SQVs based on a more rigorous assessment of benthic toxicity effects as well as the quality of the underlying data. Many of the 1997 criteria were changed based on inadequate supporting data or quality assurance concerns; the 2003 SQVs are therefore the more valid criteria (Ecology, 2003).

Catch Basins are not Representative of Sediment Quality in the Receiving Water. Catch basins are not an appropriate assessment point for sediment quality. Aquatic organisms do not live in catch basins or drainage pipes. The JSCS recognizes that "piped discharges of soluble contaminants are typically diluted through rapid mixing with the waters of the receiving body", yet the proposed screening evaluation makes no account of these mixing processes. Similarly, suspended sediments in piped discharges are rapidly mixed and dispersed with ambient sediments in transport in the river, and further, chemical exchange occurs between the sediment particles and the water column during mixing, settling, and resuspension (Thornburg, 2003; DeLeon et al., 2004).

Analysis of catch basin sediments is useful for source tracing purposes, i.e., to identify anomalous concentrations that may help to locate the points of entry of significant source loads within a drainage basin. However, catch basin sediments should not be evaluated on the basis of sediment quality criteria because catch basin sediments represent neither a point of exposure to aquatic life, nor an accurate profile of sediment quality in the receiving water.

Misapplication of "Point of Discharge" Principle in Groundwater. One of the underlying principles of the JSCS is "The initial point of compliance for screening should be near the point

of discharge to the river." However, the groundwater evaluation specifies that "Screening should be conducted at each groundwater monitoring well and groundwater data point. Potential dilution should not be included in screening." To compare all groundwater quality data to surface water criteria is both an unrealistic approach and a contradiction to the underlying principle. Only downgradient, waterfront monitoring wells are relevant to the screening evaluation, and an attenuation factor should be incorporated to account for transport through the aquifer to the actual point of discharge to the river.

Use of SLVs to Define Groundwater Plumes. The groundwater screening process presented in the JSCS relies on the term "plume" to provide guidance on the investigation methods to be used for source evaluation. The document does not provide a definition of "plume", but implies that a plume exists where chemical concentrations in groundwater exceed SLVs. If the guidance intends the use of SLVs to identify the presence of a plume, this will result in the identification of multiple plumes at essentially every upland facility, since many of the SLVs are at or below laboratory method reporting limits. If the guidance does not intend for SLVs to be used for plume identification, the JSCS should be revised to include a methodology for identifying plumes that are based on standard laboratory reporting limits and account for background concentrations.

Ranking Criteria are Ambiguous. According to the JSCS, high priority source control sites are those that "…*significantly* exceed applicable SLVs at the point of discharge to the river", or where a "bioaccumulative chemical is detected at concentrations *significantly* above the SLV." A medium priority site is one in which "…one or more media exceed applicable SLVs, but not *significantly*…". The use of the term "significant" as a ranking criterion in this context is ambiguous and subjective. It holds no promise for ensuring a predictable and consistent ranking process between sites or between DEQ project managers.

Furthermore, even a "significant" exceedence of one of ninety-plus bioaccumulative SLVs is not sufficient grounds to justify a high priority ranking. The chemical must first be demonstrated to be present in Portland Harbor fish tissue at concentrations that pose a potential risk to humans or wildlife in order for this pathway to be confirmed. Bioaccumulation issues are discussed further below.

As discussed under GENERAL COMMENTS, source control decisions should place a high value on chemical mass loadings, and the relative contributions of various sources to the overall chemical inventory in the harbor. The best source control decisions are those that remove the most kilograms of contaminant in the most cost-effective way. The JSCS makes little or no account of mass loading, whereas this should be a primary ranking criterion.

Bioaccumulation

Bioaccumulation Exposure Scales are Inappropriate. Bioaccumulation-based risk scenarios must take into account the scales of exposure in time and space. The importance of the time component of exposure has long been recognized in EPA guidance:

> *"The duration of the averaging period for the WLA* [waste load allocation] *should be selected to be consistent with the assumptions used to derive the water quality criteria…The human health criteria for carcinogens are derived assuming lifetime exposure…The criteria thus apply to the ambient water concentrations averaged over a 70-year period"* (EPA, 1991, p. 88).

The evaluation proposed in the current draft of the JSCS neglects these considerations.

For example, bioaccumulation-based water quality criteria are inappropriately applied to stormwater discharges. A storm event has a duration measured in hours, or at most, days, whereas the risks associated with bioaccumulation of carcinogens are based on an exposure period of seventy years. The exposure durations are irreconcilable, by about four orders of magnitude.

Similarly, the application of bioaccumulation-based water quality criteria to groundwater discharges is inappropriate at the spatial scale of the exposure. Because of the slow and diffuse nature of groundwater seepage, and the considerable flow of the Willamette River, groundwater is rapidly diluted upon discharge, probably within a few inches of the river bed. Unless groundwater is being discharged directly into a mussel bed which is actively harvested by humans, mammals, or birds, the concentration in groundwater is not representative of the exposure concentration to which a bioaccumulative organism will be exposed.

Bioaccumulation should be evaluated on a Mass Basis, Not a Concentration Basis. Because of the inconsistencies described above, bioaccumulation is best evaluated on a mass basis, not a concentration basis, following a procedure similar to a TMDL. Scientifically defensible bioaccumulation-based criteria have been developed in the context of TMDL studies. In such studies, the total mass loading of a chemical of concern to a receiving water body is estimated, as well as the threshold loading capacity of the receiving water, above which water and/or sediment quality impairment may occur at scales relevant to bioaccumulation processes. This more holistic and watershed-based assessment is lacking in the JSCS.

Bioaccumulation Screening Levels are Inappropriate. Bioaccumulation-based screening levels are being misapplied. Such criteria are extremely site-specific and pathway-specific and are difficult to generalize, if they can be generalized at all. The use of appropriate exposure durations, feeding areas, sediment-biota partitioning factors, and error rates is critical to the development and use of any such criteria; however, we believe these factors have not been appropriately considered. We question the assumptions underlying DEQ's 2001

Bioaccumulative Sediment SLVs, particularly because these values did not, to our knowledge, undergo public review and comment.

EPA and DEQ would benefit from collaboration with regional bioaccumulation experts, including their own experts as well as representatives from the Corps, NMFS, Washington Department of Ecology, and others, who have been working on bioaccumulation issues for several years through the Bioaccumulation Work Group (Hoffman, 2004) and the Regional Sediment Evaluation Team (RSET). The Bioaccumulation Subcommittee of RSET recently reported that sufficient data are not yet available to develop bioaccumulation-based freshwater sediment screening levels for the Pacific Northwest.

BCOCs are based on Inadequate "Reason to Believe". The bioaccumulative chemicals of concern (BCOCs) are based on inadequate "reason to believe". Like many other aspects of the proposed JSCS, this unrealistic approach results in the "screening in" of many insignificant chemicals and will result in the wasteful expenditure of resources for issues that are negligible in terms of overall risk to human health and the environment.

The BCOC list in the JSCS is based on the chemical's octanol-water partitioning coefficient (Kow) and whether the chemical was detected in LWG fish tissue. However, the detection criterion, which should be the more important criterion, was used in a discretionary basis, such that chemicals were retained on the BCOC list even if they were undetected in fish tissue. This is inadequate "reason to believe" the chemical poses a bioaccumulation risk. A far more rigorous BCOC evaluation process was conducted as part of the Bioaccumulation Work Group (Hoffman, 2004). The JSCS agencies would do well to consider the results of that work.

Mere detection in fish tissue does not constitute reason to believe. The more appropriate BCOC criterion is detection in fish tissue at concentrations which pose a risk to humans or wildlife through bioaccumulation. It is likely that such a risk analysis will be completed during the Baseline Risk Assessment for the Portland Harbor. That would be the appropriate time to incorporate bioaccumulation pathways in source control evaluations. Until then, such evaluations run a high risk of wasting both public and private resources.

Bioaccumulation Evaluation is Premature. Because bioaccumulation requires the consideration of site-specific exposure durations, fish species, migration patterns, and human and wildlife receptors, these risks are more appropriately evaluated in the Baseline Risk Assessment (BRA) being conducted by the Lower Willamette Group (LWG). Bioaccumulation in the Portland Harbor must be evaluated holistically, at the scale of the receiving water body (i.e. Portland Harbor) and in consideration of the cumulative effects of all contributing sources. Such an evaluation cannot be conducted in a piecemeal fashion on an individual site basis, as proposed in the JSCS.

It would be a wasteful exercise to attempt to screen sites for bioaccumulation risk before the BRA is completed, because it has not yet been determined what the real bioaccumulative chemicals of concern (BCOCs) are for the Portland Harbor. Typically, the bioaccumulation risk at sediment cleanup sites is largely determined by one or at most a few BCOCs, such as PCBs or DDTs. There are no fewer than ninety BCOCs listed in Table 3-1. Although it is quite likely that the overwhelming majority of these BCOCs will prove to contribute negligible risk to the Portland Harbor, the exceedence of any of these criteria could trigger an expanded investigation, at a minimum, at an individual site according to the proposed screening procedure.

Until such time as the BRA is completed, the focus of the Portland Harbor source control strategy should be toward those sources which pose an imminent and substantial danger, or which constitute a large ongoing source of chemical mass loading to the river. Interim source control actions focused on known hot spots, free product releases, and large ongoing chemical loads will, at the same time, provide cost-effective steps toward controlling bioaccumulation.

Portland Harbor is not a Viable Drinking Water Source

Drinking water is not a viable beneficial use for the Willamette River in Portland Harbor. The current and future use of the Willamette River in the Portland Harbor for navigation, transportation, and commerce in support of waterfront trade and industry precludes feasible use of harbor river water as a drinking water source. Vessel traffic alone makes this beneficial use infeasible because maritime vessels, through exhaust, stack emissions, paint ablation, fuel leaks, etc. are a known source of pollution. We would no sooner site a drinking water source next to a high-traffic interstate highway.

Maritime commerce makes a significant contribution to the regional economy. Furthermore, it is an irreplaceable beneficial use of the river. Drinking water is not only a replaceable beneficial use, considering there are far better water resources available, it is inconceivable. It is inconceivable to consider drinking from a water body that supports ocean-going vessels, bulk and liquid bulk terminals, and overflows of combined sewage from municipal outfalls. The City of Portland is doing a commendable job of bringing their combined sewer overflows under control, yet it seems unlikely they will ever be completely eliminated.

The City of Wilsonville, miles upstream of the Portland Harbor, recently built a drinking water intake to the Willamette River. This requires a sophisticated five stage water treatment system, consisting of coagulation, ozonation, activated carbon filtration, sand filtration, and chlorination, before the river water is suitable for distribution as drinking water. Yet the JSCS would require waterfront industries to only discharge water that could be routed directly to a faucet with no treatment at all. This is an unjust burden because it is based on an irrational scenario.

Change the Process for Implementation and Final Approval of Source Control Actions to Reduce the Risk of Double Jeopardy

Under the JSCS, upland source control actions "may be considered complete when DEQ and/or EPA determine that site management and other source control actions have been implemented to prevent or minimize the potential for recontamination of sediments and otherwise achieve the long-term remedial action objectives for the Portland Harbor Superfund Site." (JSCS page 5-11). On page 6-2 the JSCS further states that source control is expected move forward without delay at high priority sites, and to occur prior to the expected 2008 EPA Portland Harbor ROD at medium priority sites.

Under this approach site owners are expected to fully investigate and implement source control actions prior to the approval of the Portland Harbor ROD. Yet the JSCS also intends that the source control actions cannot be approved for completeness until it is determined that the Harbor ROD objectives have been met.

Site owners thus find themselves in the untenable position of investigating, designing, and implementing source control actions to meet the Harbor ROD objectives, which will not be determined for several years.

Therefore the JSCS approach places site owners in substantial risk of being required to execute source control investigation and actions in two phases. The first phase is the period between the present time and the issuance of the final Harbor ROD, and the second phase is after the completion of the Harbor ROD. This approach places owners at risk for taking actions in the first phase that are potentially not necessary to achieve the objectives of the Harbor ROD, or insufficient to meet the ROD objectives.

Recommendations

Through its use of unrealistic screening level values (SLVs), inappropriate exposure assumptions, and unsubstantiated analyte lists, the JSCS is an ineffective screening process that will do little to help identify and prioritize the major ongoing sources of contamination that are most deserving of source control. The proposed screening process will result in a tremendous waste of public and private resources that will be expended on the investigation of sites, pathways, and chemicals that do not contribute substantively to the overall reduction of risk to humans or the environment in the Portland Harbor. A better approach would be to develop a screening process that seeks to initially identify a short list of major contaminant sources in the harbor, based on a focused list of chemicals of concern that are likely to drive the majority of risk in the harbor. In the short term, as we await the results of the Portland Harbor Baseline

Risk Assessment, we must focus our source control resources where they will have the greatest and most immediate effect.

The SLV approach to source control is fundamentally flawed. Chemical mass loadings, rather than chemical concentrations, should be the primary basis for source control priorities and decisions. This requires an estimate of the total mass load to the harbor, as well as an estimated allocation of this load among the various contributory sources, similar to a TMDL approach. This more holistic, harbor-wide assessment which cannot be performed in isolation on a site-by-site basis, as the JSCS is currently structured.

To the extent SLVs are retained as part of a weight-of-evidence consideration in source control decisions, fundamental changes are needed to ensure they are used in a technically sound and defensible manner. Bioaccumulation-based criteria are not appropriate for use as screening levels because they are based on unrealistic assumptions regarding exposure duration and extent. Bioaccumulation pathways require input from the Baseline Risk Assessment of the Portland Harbor before these pathways can be evaluated.

Evaluation of stormwater discharges using chronic water quality criteria, let alone bioaccumulation criteria, is inappropriate and in contradiction with EPA guidance. Evaluation of catch basin sediments using sediment quality criteria, without recognition of mixing and dispersion processes in the receiving water, is also inappropriate.

The Portland Harbor is not a viable drinking water source. Nor is this the highest beneficial use for this water body. Commerce, navigation, and transportation are the irreplaceable beneficial uses for the Portland Harbor that are vital to the local economy. These beneficial uses are incompatible with drinking water use.

The process for identifying and approving source control actions should be modified to provide better assurance to site owners that resources expended prior to issuance of the Portland Harbor ROD are not wasted.

Sincerely,

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Cc: David Templeton, Anchor Environmental LLC